

**FABRICATION OF A HIGH-PRECISION BLOOMING CONTROL  
STRUCTURE FOR AN IMAGE SENSOR**

**CROSS-REFERENCE TO RELATED APPLICATIONS**

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9/16/95  
5 [001] This application is a divisional of copending U.S. Application Serial No. 09/204,483, filed December 3, 1998, <sup>now U.S. Pat. 6,331,873</sup>

**STATEMENT REGARDING FEDERALLY-SPONSORED RESEARCH**

[002] This invention was made with U.S. Government support under U.S. Air Force Contract Number F19628-95-C-0002. The U.S. Government has certain rights in this invention.

**BACKGROUND OF THE INVENTION**

10 [003] This invention relates to image sensors such as CCD imagers, and more particularly relates to structures for controlling charge blooming in an image sensor.

15 [004] The charge-coupled-device (CCD) imager, a common image sensor configuration, typically consists of an array of isolated channels in a semiconductor substrate. In operation of a conventional n-type channel CCD imager, exposure of the substrate, here p-type, to illumination from a scene to be imaged results in photogeneration of electrons in the substrate and collection of the electrons in packets in the channels. Distinct pixel regions of collected electron packets along the channels are controlled by application of appropriate voltages to gate electrodes provided on the substrate surface over the channel pixel regions. An image of a scene is thus produced by collection of pixel electron packets in response to scene illumination and timed transfer of the electron packets from the channels to electronics configured for sensing each pixel's accumulated charge packet level.

20 [005] Each pixel region along a channel has a finite charge storage capacity; that is, there is a definable maximum amount of photogenerated charge that can be accumulated in a given pixel region during an illumination period. This pixel capacity is defined by geometric, impurity doping, biasing, and other characteristics of the channel. Due to this limitation, high-intensity illumination conditions in the region of a given pixel can